

CLAIMS

What is claimed is:

1. A liquid form controlled release drug composition, comprising:
 - (a) a dispersed phase comprising an ion-exchange matrix drug complex comprising a pharmaceutically acceptable ion-exchange matrix and a water-soluble electrolytic drug associated with the ion-exchange matrix, wherein the surface charge of the ion-exchange matrix is opposite that of the electrolytic drug; and
 - (b) a dispersion medium comprising a polyelectrolyte having the same charge as the electrolytic drug.
2. The composition of claim 1, wherein the exchange matrix drug complex further comprises a porous diffusion-controlling membrane coating.
3. The composition of claims 2, wherein the porous diffusion-controlling membrane is selected from the group consisting of ethylcellulose, methylmethacrylate, cellulose esters, cellulose diesters, cellulose triesters, cellulose ethers, cellulose ester-ether, cellulose acylate, cellulose diacylate, cellulose triacylate, cellulose acetate, cellulose diacetate, cellulose triacetate, cellulose acetate propionate, cellulose acetate butyrate, and combinations thereof.
4. The composition of claim 3, wherein the diffusion-controlling membrane is ethylcellulose, methylmethacrylate, or combinations thereof.
5. The composition of claim 1, wherein the electrolytic drug has a positive charge.
6. The composition of claim 5, wherein the ion-exchange matrix is selected from the group consisting of styrene-divinyl benzene copolymers having pendant ammonium or tetraalkyl ammonium functional groups, chitosan, polylysine, gelatin, and combinations thereof.
7. The composition of claim 6, wherein the ion-exchange matrix is alginate, carboxymethylcellulose, microcrystalline cellulose, xanthan gum, carboxyvinyl polymer, gelatin or combinations thereof.

8. The composition of claim 5, wherein the polyelectrolyte is an oligomer or polymer comprising the quaternary form aminoethyl(meth)acrylate, dimethylaminoethyl(eth)acrylate, aminoethyl(meth)acrylate, dimethylaminoethyl(meth)acrylate, dimethylaminopropyl(meth)acrylamide, vinyl pyridine, vinyl-N-ethylpyridine, vinylbenzyl dimethylamine, chitosan, or any mixture thereof.

9. The composition of claim 1, wherein the electrolytic drug has a negative charge.

10. The composition of claim 9, wherein the ion-exchange matrix is selected from the group consisting of styrene-divinyl benzene copolymers having pendant ammonium or tetraalkyl ammonium functional groups, chitosan, polylysine, gelatin, and combinations thereof.

11. The composition of claim 10, wherein the ion-exchange matrix is chitosan, polylysine, gelatin or combinations thereof.

12. The composition of claim 9, wherein the polyelectrolyte is an oligomer or polymer comprising the salt form of (meth)acrylic acid, (eth)acrylic acid, itaconic acid, maleic acid anhydride, vinylsulfonic acid, vinyl sulfuric acid, styrenesulfonic, vinylphenylsulfuric acid, alginate, xanthan gum, carboxymethyl cellulose, carboxymethyl-hydroxyethyl cellulose, dextran sulfate, hyaluronic acid, heparin, chondroitin sulfate, galacturonic acid, glutamic acid, gellan gum and combinations thereof.

13. The composition of claim 1, wherein the dispersion medium comprises less than 0.01 moles of diffusible counterions per liter of said dispersion medium.

14. The method of claim 1, wherein the ion-exchange matrix drug complex is a particulate or a bead.

15. The composition of claim 1, further comprising an excipient selected from the group consisting of sweetening agents, flavoring agents, coloring agents, and any combination thereof.

16. The composition of claim 1, further comprising a dispersion additive selected from the group consisting of stabilizing agents, dispersion agents, and any combination thereof.

17. The composition of claim 16, wherein the dispersion additive has a charge similar to that of the electrolytic drug.

18. A method for preparing a liquid form controlled release drug composition, comprising:

(a) allowing a water-soluble electrolytic drug to associate with an ion-exchange matrix to form an ion-exchange matrix drug complex; and

(b) dispersing the ion-exchange matrix drug complex into a dispersion media comprising a polyelectrolyte; wherein

the surface of the ion-exchange matrix has a charge opposite that of the electrolytic drug; and

the polyelectrolyte has the same charge as that of the electrolytic drug.

19. A method for preparing a liquid form controlled release drug composition, comprising:

(a) allowing the acid form of an acid-functional ion-exchange matrix to associate with the base form of an amine-based drug to form an ion-exchange matrix drug complex; and

(b) dispersing the ion-exchange matrix drug complex into a dispersion media comprising a polyelectrolyte; wherein

the polyelectrolyte has a positive charge.

20. A method for preparing a liquid form controlled release drug composition, comprising:

(a) allowing the base form of an amine-functional ion-exchange matrix to associate with the acid form of an acid-based drug to form an ion-exchange matrix drug complex; and

(b) dispersing the ion-exchange matrix drug complex into a dispersion media comprising a polyelectrolyte; wherein

the polyelectrolyte has a negative charge.

21. A method for treating a condition or symptom, comprising administering a liquid form controlled release drug composition of claim 1 to a patient in need thereof.

22. The method of claim 18, wherein the electrolytic drug is codeine or morphine.